SECTION 329

PLANT MIXED SEAL COAT CONSTRUCTION

329.1 GENERAL: Plant mixed seal coat (PMSC) construction shall be used on all streets with a posted speed of 40 mph and greater, and consist of proportioning, mixing in a central plant, aggregate, bituminous materials, admixtures as required, transporting, placing, and compaction, in substantial compliance with this specification, at the areas/volumes and dimensions specified in the CONTRACT plans and specifications. The CONTRACTOR shall be solely responsible for the PMSC materials and construction. A job mix formula used for PMSC shall be certified in accordance with the requirements of Section 13 of these specifications. Each job mix formula submitted and authorized for use under this specification shall be identified by a number, unique to that job mix formula and production plant. If either a change in material(s) or material supplier(s) from that specified in the job mix formula occurs during a project, authorized use of the job mix formula on the project may be canceled as directed by the ENGINEER. A job mix formula shall not be used on a project without written approval of the Engineer. A job mix formula, upon request by a supplier, may be authorized by the Public Works Department Construction Division for use on City and City related projects for a period of 14 months, from the date of sampling of aggregates used in the job mix formula. Plant mix seal coat shall be used on all streets with a posted speed of 40 mph and greater.

329.2 REFERENCES:

329.2.1 American Society For Testing and Materials (ASTM):

C88 Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
C117 Method for Material Finer Than 0.75 um (No.200) Sieve In Mineral Aggregates by Washing
C131 Test Method for Resistance to Degradation of Small-size Coarse Aggregate by Abrasion and Impact in a Los Angeles Machine
C136 Method for Sieve Analysis of Fine and Coarse Aggregate
D242 Specifications for Mineral Filler for Bituminous Paving Mixtures
D692 Specification for Coarse Aggregate for Bituminous Paving Mixtures
D979 Methods of Sampling Bituminous Paving Mixtures
D995 Specification for Mixing Plants for Hot-Mixed, Hot Laid Bituminous Paving Mixtures
D1073 Specification for Fine Aggregate for Bituminous Paving Mixtures
D1074 Test Method for Compressive Strength of Bituminous Mixtures
D1559 Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus
D2041 Theoretical Maximum Specific Gravity of Bituminous Paving Mixtures
D2493 Viscosity-Temperature Chart for Asphalts
D2726 Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Saturated Surface-Dry Specimens
D2851 Test for Determining the Percentage of Fractured Particles in Coarse Aggregate
D2950 Density of Bituminous Concrete in Place by Nuclear Methods
D3203 Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures
D3515 Standard Specification for Hot Mixed, Hot-Laid Bituminous Paving Mixtures
D4791 Test for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate

329.2.2 American Association of State Highway and Transportation Officials (AASHTO) (Latest Edition):

MP2 Specification for Superpave™ Volumetric Mix Design
PP-28 Superpave™ Volumetric Design for HMA
TP 4 Preparation of Compacted Specimens of Modified and Unmodified Hot Mix Asphalt by Means of SHRP Gyratory Compactor
PP 2 Short and Long-term Aging of Bituminous Mixes
T53 Quantitative Analysis of Bitumen From Bituminous Paving Mixtures, Ignition Oven Method A
T245 Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus
T283 Resistance of Bituminous Mixture To Moisture Induced Damage
T304 Uncompacted Void Content of Fine Aggregate

329.2.3 This publication:

SECTION 13 WARRANTY AND GUARANTEE; TESTS AND INSPECTIONS; CORRECTIONS, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK
SECTION 112 ASPHALT BINDER
SECTION 113 EMULSIFIED ASPHALTS

329.3 MATERIALS:

329.3.1 AGGREGATE:

329.3.1.1 Aggregates shall be crushed stone, crushed gravel, and natural or manufactured sand. Coarse aggregate(s) shall comply with the requirements of ASTM D692, Coarse Aggregate for Bituminous Paving Mixtures and this specification. Fine aggregate(s) shall comply with the requirements of ASTM D1073, Fine Aggregate for Bituminous Paving Mixtures and this specification. Aggregates shall be certified to comply with the requirements of this Specification and authorized for use by The ENGINEER before the materials may be incorporated in the construction. Prior to delivery of the aggregates or material containing the aggregates, The CONTRACTOR may be required to furnish samples of the aggregates to The ENGINEER for testing. Daily production aggregates gradations shall be submitted to the ENGINEER, upon request.

329.3.2 ASPHALT BINDER

The asphalt binder shall be the performance grade binder PG76-28 and shall comply with the requirements of SECTION 112.

329.4 PROPORTIONING

329.4.1 The CONTRACTOR shall be solely responsible for a plant mixed seal coat job mix formula (jmf) proportions either batched at and/or delivered to a project. PMSC shall be proportioned with a "performance grade binder" in accordance with the procedures defined in 'Preparation of Compacted Specimens of Modified and Unmodified Hot Mix Asphalt by Means of SHRP Gyratory Compactor and requirements of the SHRP-A-407, *The SUPERPAVE Mix Design Manual for New Construction and Overlays*, Level 1 SUPERPAVE Design Mix' and TABLE 329B, and TABLE 329.C. A job mix formula shall be designed under the direct supervision of a New Mexico Registered Professional Engineer who has completed a certified "SUPERPAVE Mixture Design & Analysis" Short Course.

329.4.1.2 Asphalt concrete design and analysis shall be performed in a laboratory accredited in accordance with the requirements of the New Mexico State Highway and Transportation Department "Procedure for Approval of Testing Laboratories to Perform Inspection, Testing, and Mix Design Services", April 13, 1998 Edition, under the direct supervision of a New Mexico Registered Professional Engineer.

329.4.1.3 The testing equipment used in the performance of design development testing shall be (1) certified to comply with the specifications, and (2) calibrated annually with standards traceable to the National Bureau of Standards, as specified by the manufacturer. Certificates of calibration and equipment standards shall be maintained at the laboratory for review and shall be submitted to the ENGINEER upon request.

329.4.2 Aggregates, mineral filler, and anti strip admixture if required, shall be proportioned to provide a combined aggregate gradation that complies with the requirements specified in Table 329.A and 329.B, and have the same or similar shape characteristic gradation curve as the specification limits when graphically plotted on a standard "0.45 POWER" gradation chart. The gradation shall be reported to the nearest whole per cent for material passing sieves above the 0.075 mm (no. 200) sieve, and to the nearest 0.1 per cent or material passing the 0.075 mm (no. 200) sieve. The theoretical maximum density gradation curve shall be the curve represented by a straight line drawn from the intersection of the ordinate and abscissa of the graph to the one hundred percent passing point for the nominal maximum size aggregate.

TABLE 329.A - GRADATION

Sieve Designation	Percent by Weight Passing Sieve		Production Tolerance
in. (mm)	Min	Max	± %
3/4 (19.0)	100	100	
5/8 (16.0)	92	98	8
½ (12.5)	70	85	8
3/8 (9.5)	40	60	8
no.4 (4.75)	15	25	7
no.16 (2.36)	5	15	5
no.50 (0.30)	3	12	5
no.200 (0.075)	2.0	8.0	2.0

TABLE 329.B - AGGREGATE PROPERTIES

	Specification	Procedure
Fractured Faces Material > no.4 (4.75 mm)	75%, min w/2 frac faces	Visual
Clay content, min %	0.0	ASTM D 2419
Deleterious material, max %	1.0	ASTM C 142
LA Abrasion, material > no.8 (2.36 mm)	40 % max loss	ASTM C 131
Soundness	15 % max loss, after 5 cycles	ASTM C 88

329.4.3 The job mix formula asphalt binder content shall be proportioned to comply with the requirements defined in TABLE 329.C. The percentage of binder shall be determined based on laboratory testing complying with the requirements of this specification, submitted by the CONTRACTOR, and authorized by the ENGINEER. The production tolerance of an asphalt binder shall be ± 0.3 per cent as determined by the tank strap method and ± 0.5 per cent as determined by laboratory quantitative analysis methods.

329.4.4 The materials specified in a job mix formula shall be the same source and type for all plant mix seal coat batched, delivered, placed and compacted, under the identification code defined for the authorized job mix formula.

TABLE 329.C - QUIET ASPHALT CONCRETE DESIGN SPECIFICATIONS

Characteristics @ Nd		Specification
A. Binder Content, PG76-28, %		5.5 to 6.5
B. Voids in Mineral Aggregate (VMA), min %		25
C. Air voids, %		17 - 19
D. Voids filled with asphalt, (VFA), min %		30
E. Gyratory Compactive Effort @ compaction temperature[2]		
Gyrations	N	Compaction, % [1]
Ni (initial)	7	<75
Nd (design)	95	81-83
Nm (max)	150	<85
F. Moisture susceptibility, min % retained strength @ design % air voids, AASHTO T283		80

[1] As % of maximum theoretical specific gravity / density, Gmm.
[2] Specific by asphalt binder certification

329.4.5 The materials specified in a job mix formula shall be the same source and type for all quiet asphalt concrete batched, delivered, placed and compacted, under the identification code defined for the authorized job mix formula.

329.4.6 SUBMITTALS

329.4.6.1 A job mix formula submittal shall include but not be limited to the information specified in Table 328.D.

TABLE 329.D - SUBMITTAL INFORMATION

I. Identification
- A. Asphalt concrete supplier
- B. Laboratory that performed design/development tests
- C. Date of Submittal
- D. Unique mix code identification number
- E. Aggregate sample date

II. Job Mix Formula (jmf)
- A. City type/application of asphalt concrete
- B. Component material target proportions to include combined aggregate gradation and asphalt content, specifications, and production tolerances
- C. 0.45 power gradation plot of combined aggregate gradation with specification and production limits
- D. Temperature viscosity relationship of binder
- E. Recommended mixing, compaction, and release to traffic maximum temperatures.
- F. Tabulation of job mix formula performance characteristics defined in TABLE, at the proposed design proportions, with reference specification limits and production limits (if specified), maximum theoretical specific gravity/density (as pcf), and bulk specific gravity/density (pcf).
- G. Reference daily production gradation, see 116.3.2

III. Certifications of Compliance
- A. Compliance of job mix formula by NM Registered Professional Engineer in direct charge of design/development;
- B. Design Laboratory Certification.
- C. Component materials testing and certification by supplier/manufacturer with supporting test data for materials used in design development
- D. Certification and laboratory test results of asphalt binder used in job mix formula design development, see 112.4.1.2.

IV. Design Development (Tables and graphs, with specifications limits of the following:)

1. Trial Designs: Aggregate gradations, 3 minimum required, and trial asphalt binder content (%)
   - a) Table of Aggregate Gradations and 0.45 power plot, with specification limits
   - b) Trial design % asphalt content
   - c) Trial designs volumetric analysis for each gradation, VMA, Va, VFA, graph not required
   - d) Trial designs compaction analysis @ Ni, Nd, and Nm, for each gradation
   - e) Dust ratio for each trial design, graph not required.
2. Job Mix Formula Design, (design development with a minimum of 4 asphalt binder contents required, and the recommended design characteristic bracketed by a minimum of two test points for the design binder content $\pm$ 0.5%)
   - a) Table of design aggregate gradation and 0.45 power plot, with specification limits and production targets
   - b) Compaction analysis G_{mb} as % G_{m}, at Ni, Nd, and Nm, vs asphalt content (separate graphs for Ni, Nd, and Nm)
   - c) Volumetric analysis of VMA, Va, VFA, and dust ratio at design gyration, @Nd, vs % asphalt content
   - d) Gyratory compaction tables as height of sample versus gyration, for each asphalt content, Gmb @ NM, and bulk specific gravity/density correction factor(s) (graphs not required)
   - e) Maximum theoretical specific gravity/density (as pcf), G_{mm}, vs %asphalt content
   - f) Corrected bulk specific gravity/density (as pcf), G_{mb}, vs % asphalt content
   - e) dust ratio vs.% asphalt content
   - f) Recommended gyratory sample mass(g) for 115 mm sample height at Nm

C. Ignition Correction Factor: Correction for material losses during asphalt content ignition oven analysis

The correction factor shall be determined as the average value for three samples, design % asphalt content, design - 1.0%, and design +1.0%, developed in an ignition oven complying with the requirements of AASHTO T53, Method A.

329.4.6.2 A job mix formula submittal shall be accepted or rejected within ten working (10) days of receipt by the ENGINEER. A submittal shall be rejected if it does not include the specified information.

329.5 CONSTRUCTION METHOD:

329.5.1.1 PMSC shall be batched in accordance with the requirements of ASTM D3515, the requirements of this Specification, or as authorized by the ENGINEER. Batching facilities shall comply with the requirements of ASTM D995, and this Specification. A batch plant shall be certified annually by a New Mexico Registered professional Engineer, to comply with the requirements of this Specification and Section 13. Certification shall be completed within 12 months prior to submittal of a job mix formula to be produced at the plant. The batch plant shall be calibrated annually with calibration standards traceable to the National Bureau of Standards. Certificates of calibration and production certifications shall be maintained at the plant for review and shall be submitted to the ENGINEER upon request.

329.5.1.2 The mineral aggregate mixing temperature shall be not less than nor greater than the mixing temperature range specified in the authorized job mix formula

329.5.1.3 Asphalt binder mixing temperature shall be not less than nor greater than the mixing temperature range specified in the authorized job mix formula when introduced into the mixture.

329.5.1.4 The mineral aggregate and asphalt binder shall be proportioned as specified in the authorized job mix formula and mixed until all aggregate particles are thoroughly and uniformly coated with asphalt binder.

329.6 DELIVERY

329.6.1.1 Plant mixed seal coat shall be delivered in trucks free of fluid leaks. Trucks detected to have leaks shall not be allowed on the project. Subgrade, base course, and asphalt concrete surfaces contaminated by uncontrolled equipment fluids shall be removed and replaced with complying material. Contaminated material shall be disposed of as specified. When hauling time from the mixing plant to the job site exceeds two hours or when inclement weather prevails, bituminous mixtures shall be covered with tarpaulins while being hauled. The tarpaulins shall completely cover the load and be firmly tied down. Mixtures shall be delivered to site of the work and placed without segregation of the ingredients and within the temperature range specified in the authorized job mix formula. Diesel fuel or other petroleum based solvents shall not be used in the bed of transport vehicles as a release agent to prevent build up of the asphalt material. Material contaminated with diesel fuel or other petroleum based solvents shall be removed and replaced with complying material by the CONTRACTOR, as directed by the ENGINEER, at no cost to the OWNER.

329.6.1.2 The CONTRACTOR shall provide to The ENGINEER with each load of plant mixed seal coat, a delivery ticket with the information contained in Table 329.D. A copy of the ticket shall be available for the ENGINEER and a copy shall be available for quality assurance sample reference. Diesel fuel or other petroleum based solvents shall not be used in the bed of transport vehicles as a release agent to prevent build up of the SUPERPAVE asphalt material. If the use of diesel is detected, the load shall be rejected.

TABLE 329.D - DELIVERY TICKET INFORMATION

Name of Asphalt Concrete Supplier
Date of Delivery
Delivery Ticket Number Contractor
Project Name (optional)
Job Mix Formula Number
Weight of Load (tons)
Time loaded

329.6.1.3 PMSC shall be delivered to project at a temperature that allows for placement and start of compaction in the compaction temperature range specified in the authorized job mix formula.

329.7 PLACEMENT AND COMPACTION:

329.7.1.1 Plant mixed seal coat shall not be placed before March 1 or after September 31 of a calendar year, except as herein provided. The CONTRACTOR may be granted special permission to place Plant Mix Seal Coats after September 30, as authorized by the ENGINEER. However, under no conditions will the Contractor be permitted to place a Plant Mix Seal Coat on wet pavements, or when the ambient temperature is less than 60°F, or under other conditions of weather that would preclude satisfactory results.

329.7.1.2 Plant mixed seal shall be constructed only when the surface is dry, when the mat surface temperature on which it is to be placed is 60°F or above, when the weather is not foggy, rainy, or stormy; and when the weather is favorable to obtain the desired results.

329.7.1.3 Prior to placing plant mixed seal coat, all foreign matter shall be swept cleaned from the surface of the existing pavement.

329.7.1.4 A tack coat shall be applied to provide a uniform and complete coverage, as directed by the ENGINEER. Tack shall consist of either SS-1 or SS1h emulsified asphalt, diluted with an equal volume of water, at the rate of 0.03 to 0.12 gal/yd2. The exact quantities being determined by the ENGINEER. Tack shall not be puddled.

329.7.2 Plant mixed seal coat shall be placed in a compacted layer equal or greater than nominal maximum size of the aggregate and/or equal or less than 3/4 of an inch, by means of a bituminous paver conforming to the requirements of Section 336. The temperature of the mixture shall be not less than nor greater than the compaction temperature range specified in the authorized job mix formula after placement on the road, behind the lay down machine.

329.7.3.1 The surface shall be finished smooth, true to the dimensions shown on the plans with a minimum of three passes with a self propelled steel wheeled roller having a minimum rated capacity of 20 tons.

329.7.3.2 Finish rolling shall begin when the quiet asphalt concrete temperature is in the compaction temperature range specified in the authorized job mix formula. Finish rolling shall be completed before the temperature of the material cools to less than 200 °F.

329.7.3.3 Finish rolling equipment shall be steel wheeled, free of fluid leaks, selected by the CONTRACTOR, and authorized by the ENGINEER. Equipment detected to have leaks shall not be allowed on the project.

329.7.3.4 Finish rolling equipment may be either static or dynamic (vibratory). All equipment shall be ballasted and operated as recommended by the manufacturer. Motorized wheeled dynamic (vibratory) equipment shall have the frequency rate and amplitude setting readily available for review by the ENGINEER. Frequency rate and amplitude adjustability shall be operable on so equipped motorized wheeled dynamic (vibratory) equipment. Motorized wheeled dynamic (vibratory) equipment with inoperable frequency rate and amplitude adjustment features shall not be used on the project.

329.7.3.5 Finish rolling equipment shall be equipped with automatic wheel spray systems to apply release agents to prevent tracking of asphalt concrete. Diesel fuel or other petroleum based solvents shall not be used as a release agent to prevent build up of the asphalt material. Material contaminated with diesel fuel or other petroleum based solvents shall be removed and replaced with complying material by the CONTRACTOR, as directed by the ENGINEER, at no cost to the OWNER.

329.7.3.6 Repair and replacement of damaged adjacent property and structures, resulting from the use of vibratory rolling equipment, shall be the responsibility of the CONTRACTOR, at no cost to the OWNER.

329.7.4 The surface shall be finished smooth, true to the dimensions shown on the plans. It shall be free of any surface irregularities in excess of 3/16 inch in 10 feet, when tested with a 10 feet long straight edge resting on any two (2) supports of equal height. Any defective areas shall be immediately corrected removing the defective areas, replacing them with new material to conform to the remainder of the pavement, as directed by the ENGINEER. Such work shall be done by the CONTRACTOR at no cost to the owner.

329.8 SAMPLING AND TESTING

329.8.1.1 Plant mixed seal coat material shall be sampled at the greater rate of one sample for each 250 tons, or fraction thereof, placed each day as directed by the ENGINEER. Tests shall be performed under the direct supervision of a New Mexico Registered Professional Engineer who has completed a certified "SUPERPAVE Mixture Design & Analysis" Short Course. in accordance with the requirements of this Specification the Supplemental Technical Specifications, or as directed by The ENGINEER.

329.8.1.2 Quality assurance asphalt concrete analysis shall be (1) performed in a laboratory accredited in accordance with the requirements of the New Mexico State Highway and Transportation Department "Procedure for Approval of Testing Laboratories to Perform Inspection, Testing, and Mix Design Services", April 13, 1998 Edition, and (2) under the direct supervision of a New Mexico Registered Professional Engineer.

329.8.1.3 Testing equipment used in the performance of specified testing shall be calibrated annually with calibration standards traceable to the national Bureau of Standards. Certification records shall be maintained at the Laboratory for review by The ENGINEER. A copy of the certifications shall be submitted to The ENGINEER upon request.

329.8.2 A plant mixed seal coat sample shall be tested for but not limited to the properties combined aggregate gradation, asphalt binder content, and maximum theoretical specific gravity/density, and reported as required in 329.E.

TABLE 329.E
FIELD SAMPLE LABORATORY TESTS

I. Analysis

A. Analysis at authorized jmf gyrations, N_i (initial), N_d (design), and N_m (max). (1) Two briquettes required. (2) Report average of test results of two briquette tests. (3) Sample aging is not required.

B. Volume characteristics of compacted briquettes with authorized jmf production specifications @ N_i, N_d, and N_m.

1 VMA, voids in mineral aggregate;

2 Va, voids in asphalt concrete;

3 VFA, voids filled with asphalt binder;

4 Gmb, bulk specific gravity and density, with authorized jmf target

II. Gmm, maximum theoretical specific gravity and density, with authorized jmf target

III. Asphalt binder content (Ignition oven ASHTO T53, method A)

IV. Extracted Combined Aggregate

A. Gradation

B. Coarse aggregate angularity, material > 4.75 mm

C. Flat and elongated particles, 3:1 or greater dimension, material > 4.75 mm, %

D. Fractured Faces, material > 4.75 mm

329.8.3 A CONTRACTOR may challenge production material test results, binder content and aggregate gradation, and request that the retained split asphalt concrete sample of record be released to his assigned laboratory and tested for compliance, as authorized by the ENGINEER. Notification of challenge shall be made in writing to the ENGINEER by the CONTRACTOR within 28 calendar days from date of sampling. Challenge test results shall be submitted to the ENGINEER for evaluation no later than 42 calendar days from date of sampling. Challenge test results will be evaluated in accordance with the "multi laboratory" precision tolerances specified, T53 for binder content, ASTM C117 and C136 for aggregate gradation. Challenge and record test results that comply with precision tolerances will be averaged with the companion test results of record and the material pay factor, PF_M, recalculated, as directed by the ENGINEER. Challenge and record test results that do not comply with the precision tolerances will direct the disqualification of the challenged and record samples, as directed by the ENGINEER. Cut/core sample(s) will be taken from the area(s) represented by the disqualified challenge sample(s) and evaluated by the lab of record under the observation of the CONTRACTOR, in accordance with the requirements of this specification and replace the disqualified sample test results. Analysis of the replacement cut/core sample(s) may not be challenged. The CONTRACTOR will submit challenge test results in writing to the ENGINEER for each split sample released to his assigned laboratory of record. Challenges filed after the time limitations will not be considered. The OWNER shall pay for all complying tests.

329.8.4 Test results shall be reported to The ENGINEER, CONTRACTOR, Supplier and Materials and Testing Laboratory, Construction Division, Public Works Department, in writing, within 7 working days of completion of the sampling of the asphalt and/or the field testing. Non-complying tests shall be reported to The ENGINEER, CONTRACTOR, supplier and Materials and Testing Laboratory, Construction Division, Public Works Department, within 1 working day of completion of the test.

329.8.5 The New Mexico Registered Professional Engineer in direct charge of the laboratory shall certify on a quality assurance test report that the test procedures used to generate the report complied with the specifications.

329.9 MEASUREMENT AND PAYMENT:

Plant mixed seal coat shall be measured separate by either the ton or square yard of materials placed on a project, measured complete, in place, and accepted, as specified in the CONTRACT. Unit of payment will be at the adjusted CONTRACT unit price(s) as specified in 329.9.1, as authorized by the ENGINEER .

329.9.1 Plant mixed seal coat shall be paid at the adjusted CONTRACT unit price, adjusted for payment by the equation below and TABLE 329.F, as authorized by the ENGINEER. The material factor, PFm, is the acceptance factor for material placed on a project each day. It shall be defined in accordance with TABLE 329.F, based on the deviation of the average value or arithmetic mean (M) of the daily acceptance sample(s) test results, for either combined aggregate gradation or binder content, from the reference target (T), as specified in the authorized job mix formula. If the deviation of the daily mean (average), M, from the target, T, exceeds the maximum allowable deviation, D', for a LOT, $|T-M| > D'$, the LOT shall be removed and replaced with material complying with this specification, at no cost to the OWNER, as directed by the ENGINEER. If it is determined by the ENGINEER to be more practical to accept the material, the LOT may be accepted under written agreement between the OWNER and the CONTRACTOR, at an assigned pay factor of PFm= 0.70.

UP' =PFm x UP

UP', adjusted CONTRACT unit price, $/ton
UP, CONTRACT unit price, $/ton
Pfm, PAY FACTOR (see TABLE 329.E)

TABLE 329.F - MATERIAL FACTOR, PFm, FOR GRADATION & BINDER CONTENT

Number of Daily Samples	For |T-M| =/< D', [1, 2] D', Maximum Allowable Deviation [3]		
1	1.40D	1.20D	D
2	D + R	D + 0.37R	D - 0.10R
3	D + 0.30R	D + 0.07R	D - 0.14R
4	D + 0.16R	D - 0.01R	D - 0.17R
5	D + 0.11R	D - 0.03R	D - 0.20R
6	D + 0.09R	D - 0.05R	D - 0.22R
7	D + 0.07R	D - 0.07R	D - 0.24R
8	D + 0.06R	D - 0.08R	D - 0.25R
9	D + 0.05R	D - 0.09R	D - 0.26R
10 OR MORE	D + 0.04R	D - 0.10R	D - 0.27R
PFm [3]	0.85	0.95	1.00

[1] D, production tolerance +/- %, and the authorized job mix formula,
R, range of test values, maximum - minimum values, M, average test value of a LOT's samples test results,
T, target value specified in authorized job mix formula.

[2] If the deviation of the daily mean from the target exceeds the maximum allowable deviation for a LOT, |T-M| > D', the LOT shall be removed and replaced with material complying with this specification, at no cost to the OWNER, as directed by the ENGINEER. If determined by the ENGINEER to be more practical to accept the material, the LOT may be accepted under written agreement between the OWNER and the CONTRACTOR, at an assigned pay factor PFm= 0.70.

[3] The material factor, PFm, shall be the lowest of the factors calculated for either the combined aggregate gradation of material passing any of the nominal size aggregate screen, 3/8 inch, and smaller screens, or, the binder content.